

# Peaceful nuclear explosions

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(Redirected from Nuclear demolition)

**Peaceful nuclear explosions** (PNEs) are nuclear explosions conducted for non-military purposes, such as activities related to economic development including the creation of canals. During the 1960s and 1970s, both the United States and the Soviet Union conducted a number of PNEs.

Six of the explosions by the Soviet Union are considered to have been of an applied nature, not just tests.

Subsequently the United States and the Soviet Union halted their programs. Definitions and limits are covered in the Peaceful Nuclear Explosions Treaty of 1976. The Comprehensive Nuclear-Test-Ban Treaty of 1996 prohibits all nuclear explosions, regardless of whether they are for peaceful purposes or not.

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## The Peaceful Nuclear Explosions Treaty

In the PNE Treaty the signatories agreed: not to carry out any individual nuclear explosions having a yield exceeding 150 kilotons; not to carry out any group explosion (consisting of a number of individual explosions) having an aggregate yield exceeding 1,500 kilotons; and not to carry out any group explosion having an aggregate yield exceeding 150 kilotons unless the individual explosions in the group could be identified and measured by agreed verification procedures. The parties also reaffirmed their obligations to comply fully with the Limited Test Ban Treaty of 1963.

The parties reserve the right to carry out nuclear explosions for peaceful purposes in the territory of another country if requested to do so, but only in full compliance with the yield limitations and other provisions of the PNE Treaty and in accord with the Non-Proliferation Treaty.

Articles IV and V of the PNE Treaty set forth the agreed verification arrangements. In addition to the use of national technical means, the Treaty states that information and access to sites of explosions will be provided by each side, and includes a commitment not to interfere with verification means and procedures.

The protocol to the PNE Treaty sets forth the specific agreed arrangements for ensuring that no weapon-related benefits precluded by the Threshold Test Ban Treaty are derived by carrying out a nuclear explosion used for peaceful purposes, including provisions for use of the hydrodynamic yield measurement method, seismic monitoring and on-site inspection.

The agreed statement that accompanies the Treaty specifies that a "peaceful application" of an underground nuclear explosion would not include the developmental testing of any nuclear explosive.

## United States: Operation Plowshare

Operation Plowshare was the name of the U.S. program for the development of techniques to use nuclear explosives for peaceful purposes. The name was coined in 1961, taken from Micah 4:3 ("And he shall judge among the nations, and shall rebuke many people: and they shall beat their swords into plowshares, and their spears into pruning hooks: nation shall not lift up sword against nation, neither shall they learn war any more"). Twenty-eight nuclear blasts were detonated between 1961 and 1973.

One of the first U.S. proposals for peaceful nuclear explosions that came close to being carried out was Project Chariot, which would have used several hydrogen bombs to create an artificial harbor at Cape Thompson, Alaska. It was never carried out due to concerns for the native populations and the fact that there was little potential use for the harbor to justify its risk and expense. There was also talk of using

nuclear explosions to excavate a second Panama Canal.<sup>[1]</sup>

The largest excavation experiment took place in 1962 at the Department of Energy's Nevada Test Site. The Sedan nuclear test carried out as part of Operation Storax displaced 12 million tons of earth, creating the largest man-made crater in the world, generating a large nuclear fallout over Nevada and Utah. Three tests were conducted in order to stimulate natural gas production, but the effort was abandoned as impractical because of cost and radioactive contamination of the gas.<sup>[2][3]</sup>

There were many negative impacts from Project Plowshare's 27 nuclear explosions. For example, the Gasbuggy site,<sup>[3]</sup> located 55 miles east of Farmington, New Mexico, still contains nuclear contamination from a single subsurface blast in 1967.<sup>[4]</sup> Other consequences included blighted land, relocated communities, tritium-contaminated water, radioactivity, and fallout from debris being hurled high into the atmosphere. These were ignored and downplayed until the program was terminated in 1977, due in large part to public opposition, after \$770 million had been spent on the project.<sup>[5]</sup>

## Soviet Union: Nuclear Explosions for the National Economy

The Soviet Union conducted a much more vigorous program of 239 nuclear tests, some with multiple devices, between 1965 and 1988 under the auspices of Program No. 6 and Program No. 7-Nuclear Explosions for the National Economy. Its aims and results were similar to those of the American effort, with the exception that many of the blasts were considered applications, not tests.<sup>[6]</sup> The best known of these in the West was the Chagan test in January 1965 as radioactivity from the Chagan test was detected over Japan by both the U.S. and Japan. The United States complained to the Soviets, but the matter was dropped.

In the 1970s, the Soviet Union started the "Deep Seismic Sounding" Program, that included the use of peaceful nuclear explosions to create seismic deep profiles. Compared to the usage of conventional explosives or mechanical methods, nuclear explosions allow the collection of longer seismic profiles (up to several thousand kilometers).<sup>[7]</sup>

There are proponents for continuing the PNE programs in modern Russia. They (e.g. A. Koldobsky) state that the program already paid for itself and saved the USSR billions of rubles and can save even more if continued. They also allege that the PNE is the only feasible way to put out large fountains and fires on natural gas deposits and the safest and most economically viable way to destroy chemical weapons.

Their opponents (include the academician A.V. Yablokov)<sup>[8]</sup> state that all PNE technologies have non-nuclear alternatives and that many PNEs actually caused nuclear disasters.

Reports on the successful Soviet use of nuclear explosions in extinguishing out-of-control gas well fires were widely cited in United States policy discussions of options for stopping the Deepwater Horizon oil spill.<sup>[9][10]</sup>

## Other nations

Germany at one time considered manufacturing nuclear explosives for civil engineering purposes. In the early 1970s a feasibility study was conducted for a project to build a canal from the Mediterranean Sea to the Qattara Depression in the Western Desert of Egypt using nuclear demolition. This project proposed to use 213 devices, with yields of 1 to 1.5 megatons detonated at depths of 100 to 500 m, to build this canal for the purpose of producing hydroelectric power.

The Smiling Buddha, India's first explosive nuclear device was described by the Indian Government as a peaceful nuclear explosion.

In Australia, nuclear blasting was proposed as a way of mining Iron Ore in the Pilbara.<sup>[11]</sup>

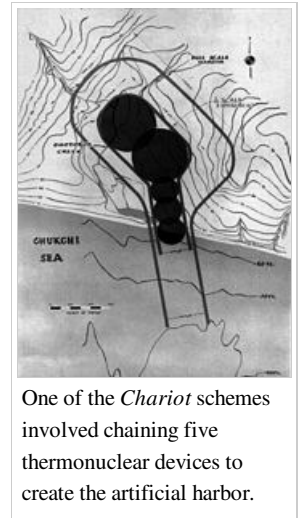
## Spaceflight Applications

Nuclear explosions have been studied as a possible method of spacecraft propulsion. The most well known example was Project Orion, which studied the possibility of a spacecraft propelled by the detonation of nuclear devices which it released behind itself.

Another application would be for deflecting or destroying celestial objects like comets, meteors, or asteroids on a collision course with Earth that have the potential for causing destruction.

## See also

- Project Gnome



## References

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- <sup>2</sup> ^ U.S. Department of Energy, Office of Legacy Management: Rulison, Colorado, Site. Fact Sheet [1] ([http://www.lm.doe.gov/Rulison/Fact\\_Sheet\\_-\\_Rulison,\\_Colorado.pdf](http://www.lm.doe.gov/Rulison/Fact_Sheet_-_Rulison,_Colorado.pdf)) .
- <sup>3</sup> ^ <sup>a</sup> <sup>b</sup> Peter Metzger (February 22, 1970). *Project Gasbuggy And Catch-85*: *\*That's krypton-85, one of the radioactive by-products of nuclear explosions that release natural gas Project Gasbuggy and Catch-85 "It's 95 per cent safe? We worry about the other 5"*. New York Times. p. SM14.
- <sup>4</sup> ^ "DOE Environmental Management (EM) - Gas Buggy Site" (<http://www.em.doe.gov/SiteInfo/PrjGasBuggy.aspx>) . Em.doe.gov. <http://www.em.doe.gov/SiteInfo/PrjGasBuggy.aspx>. Retrieved 2010-09-19.
- <sup>5</sup> ^ Benjamin K. Sovacool (2011). *Contesting the Future of Nuclear Power: A Critical Global Assessment of Atomic Energy*, World Scientific, pp. 171-172.
- <sup>6</sup> ^ Nordyke, M. D. (2000-09-01). *The Soviet Program for Peaceful Uses of Nuclear Explosions* (<https://e-reports-ext.llnl.gov/pdf/238468.pdf>) . Lawrence Livermore National Laboratory. pp. 34–35. DOI:10.2172/793554 (<http://dx.doi.org/10.2172/793554>) . Report no.: UCRL-ID-124410 Rev 2. <https://e-reports-ext.llnl.gov/pdf/238468.pdf>. U. S. Department of Energy contract no.: W-7405-Eng48.
- <sup>7</sup> ^ University of Wyoming: <http://w3.uwyo.edu/~seismic/dss/>
- <sup>8</sup> ^ "А. В. ЯБЛОКОВ, "ЯДЕРНАЯ МИФЛОГИЯ КОНЦА XX ВЕКА"" (<http://www.biometrica.tomsk.ru/ftp/medicine/jablock.htm>) . Biometrica.tomsk.ru. <http://www.biometrica.tomsk.ru/ftp/medicine/jablock.htm>. Retrieved 2011-08-13.
- <sup>9</sup> ^ Broad, William J. (2010-06-02). "Nuclear Option on Gulf Oil Spill? No Way, U.S. Says" (<http://www.nytimes.com/2010/06/03/us/03nuke.html>) . New York Times. <http://www.nytimes.com/2010/06/03/us/03nuke.html>. Retrieved 2010-06-18.
- <sup>10</sup> ^ Astrasheuskaya, Nastassia; Judah, Ben; Selyukh, Alina (2010-07-02). "Special Report: Should BP nuke its leaking well?" (<http://www.reuters.com/article/idUSTRE6611RF20100702>) . Reuters. <http://www.reuters.com/article/idUSTRE6611RF20100702>. Retrieved 2010-07-08.
- <sup>11</sup> ^ *Nuclear blasting proposed for Pilbara Iron Ore Project* in Industrial Reviews and Mining Year Book, 1970 pp.255-259

## External links

- Peaceful Nuclear Explosions (<http://www.ctbto.org/nuclear-testing/history-of-nuclear-testing/peaceful-nuclear-explosions/>) *Comprehensive Nuclear-Test-Ban Treaty Organization Preparatory Commission*
- Video of the 104Kt **Sedan** PNE (<http://www.sonicbomb.com/modules.php?name=Content&pa=showpage&pid=70>) as part of **Operation Plowshare**.
- Video of the Soviet **Chagan** PNE (<http://www.sonicbomb.com/modules.php?name=Content&pa=showpage&pid=257>)
- Video of the Soviet **Taiga** PNE (<http://www.sonicbomb.com/modules.php?name=Content&pa=showpage&pid=241>)
- On the Soviet nuclear program (<http://nuclearweaponarchive.org/Russia/index.html>)
- On the Soviet program for peaceful uses of nuclear weapons, ([http://www.osti.gov/bridge/product.biblio.jsp?query\\_id=1&page=0&osti\\_id=793554](http://www.osti.gov/bridge/product.biblio.jsp?query_id=1&page=0&osti_id=793554)) *American Office of Scientific and Technical Information*
- United States Nuclear Tests, July 1945 through September 1992 (<http://www.fas.org/nuke/guide/usa/nuclear/usnuctests.htm>) (DOE/NV-209 [Rev.14]).
- ARMS CONTROL AGREEMENTS, (<http://www.fas.org/nuke/control/index.html>) *Federation of American Scientists*
- World Reaction to the Indian Nuclear Tests, (<http://cns.miis.edu/research/india/reaction.htm>) *Center for Nonproliferation Studies*
- Nuclear Files.org ([http://www.nuclearfiles.org/menu/library/treaties/underground/trty\\_underground-peaceful-purpose\\_1990-12-11.htm](http://www.nuclearfiles.org/menu/library/treaties/underground/trty_underground-peaceful-purpose_1990-12-11.htm)) Treaty between the USA and USSR on underground nuclear explosions for peaceful purposes
- Peter Kuran's "Atomic Journeys" (<http://www.atomcentral.com/journeys.html>) – documentary film includes tests of Peaceful nuclear Explosions.

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